DETAILED ACTION

1. The amendment after final rejection filed 10/22/09 have been entered and made of record.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 10/22/09, 07/28/09 was filed after the mailing date of the Non Final Rejection on 05/11/09. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

3. Claims 1-4, 8-12, 18, 19, 20-23, 24-25 are pending.

Response to Arguments

4. Applicant's arguments filed 10/22/09 have been fully considered but they are not persuasive.

Claims 20 and 24

In the page 3, lines 13-19, the applicant argues that Qiao '582 are not disclose or teach "reducing a link's assigned initial cost under any circumstances, let alone when it is determined that the link's bandwidth can be shared with the new restoration path".

The examiner respectfully disagrees with the applicant's argument.

Qiao '582 disclose reducing a link's assigned initial cost under any circumstances, let alone when it is determined that the link's bandwidth can be shared with the new restoration path ([0058] minimizing the total amount of bandwidth equivalent by the new connection established request) ([0061] minimizing the totoal bandwidth consumed to satisfy the new connection request may be solved) ([0067] allows the new backup path to share maximum bandwidth with other existing backup paths).

In the page 3, lines 20-25, the applicant argues that Doshi '875 does not disclose or teach calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the costs of the links of the minimum-cost restoration path.

The examiner respectfully disagrees with the applicant's argument.

Doshi '875 disclose calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path (see figure 16B, step 356, assign demands to two routes with minimum capacity, using the one with least capacity for restoration, col. 30, lines 50-62, step 356, assigned to two routes with minimum capacity, using the route with the least capacity for restoration).

In the page 3, lines 25-29, the applicant argues that Doshi as specifically teaching this feature. However, the cited sections refer to <u>capacity, **not cost**</u>. These cited sections

say about link costs, let alone a minimum-cost restoration path or the sum of the costs of the links of a minimum-cost restoration path.

The examiner respectfully disagrees with the applicant's argument.

In the specification, the applicant defines where the path cost is a function of whether any additional restoration bandwidth (see abstract); link capacity is link's bandwidth (specification, page 10, lines 5-32).

Doshi '875 disclose calculating the minimum-cost (minimum capacity) restoration path (the minimum-capacity restoration path) for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path (see figure 16B, step 356, assign demands to two routes with minimum capacity, using the one with least capacity for restoration, col. 30, lines 50-62, step 356, assigned to two routes with minimum capacity, using the route with the least capacity for restoration).

For the reasons above, the examiner respectfully believes claims 20 and 24 are not patentable over the cited reference; since claims 21-23 depend variously from claim 20, it is further submitted that those claims 21-23 are also rejected over the cited references.

Claim 23

In the page 4, lines 14-19, the applicant argues that the cited section of Doshi actually discusses free capacities on links. Free capacities are not examples of path costs.

Thus, the cited section says nothing about costs, let alone (a) generating a path pair cost as the sum of the path cost of a candidate primary path and the path cost of a corresponding minimum-cost restoration path or (b) selecting a candidate primary path and a corresponding minimum-cost restoration path that together have the lowest path pair cost.

The examiner respectfully disagrees with the applicant's argument.

In the specification, the applicant defines where the path cost is a function of whether any additional restoration bandwidth (see abstract); link capacity is link's bandwidth (specification, page 10, lines 5-32).

Doshi '875 disclose generating a path pair cost as the sum of the path cost of a candidate primary path and the path cost of a corresponding minimum-cost restoration path or (b) selecting a candidate primary path and a corresponding minimum-cost restoration path that together have the lowest path pair cost (see figure 16B, step 356, col. 33, lines 14-20, selecting the minimum value for all links on each the restoration routes which is determined).

For the reasons above, the examiner respectfully believes the claim 23 is not patentable over the cited references.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 20, 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao et al. (Pub. No.: US 2003/0009582 A1), and in view of Doshi et al. (U.S.Patent No. 6,130, 875).

As to claim 20, Qiao '582 disclose for each link of a specified set of links in the network: (figure 1, each link of a set of links in the network) (1) assigning an initial cost to the link ([0113] assign each link a cost); determine whether the link's bandwidth can be shared with a new restoration path ([0029] determine whether two or more back connections can share bandwidth on a common link); reducing the link's assigned initial cost when it is determined that the link's bandwidth can be shared with the new restoration path ([0058] minimizing the total amount of bandwidth equivalent by the new connection established request) ([0061] minimizing the totoal bandwidth consumed to satisfy the new connection request may be solved) ([0067] allows the new backup path to share maximum bandwidth with other existing backup paths).

However, Qiao '582 are silent to disclosing calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path.

Doshi ‘875 from the same or similar fields of endeavor disclose calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path (see figure 16B, step 356, assign demands to two routes with minimum capacity, using the one with least capacity for restoration, col. 30, lines 50-62, step 356, assigned to two routes with minimum capacity, using the route with the least capacity for restoration).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path taught by Doshi ‘875 into the system of Qiao ‘582, since Doshi ‘875 recited the motivation in the col. 1, lines 23-25 which restoring communication in a network after a failure in link, span or node of the network, and more particular to restoration techniques in which restoration paths are pre computed at nodes distributed throughout the network.

Regarding to claim 24, Pieds '627 disclose Qiao ‘582 disclose for each link of a specified set of links in the network: (figure 1, each link of a set of links in the network) (1) assigning an initial cost to the link ([0113] assign each link a cost); determine whether the link’s bandwidth can be shared with a new restoration path ([0029]

determine whether two or more back connections can share bandwidth on a common link); reducing the link's assigned initial cost when it is determined that the link's bandwidth can be shared with the new restoration path ([0058] minimizing the total amount of bandwidth equivalent by the new connection established request) ([0061] minimizing the totoal bandwidth consumed to satisfy the new connection request may be solved) ([0067] allows the new backup path to share maximum bandwidth with other existing backup paths).

However, Qiao '582 are silent to disclosing calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path.

Doshi '875 discloses calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path (see figure 16B, step 356, assign demands to two routes with minimum capacity, using the one with least capacity for restoration, col. 30, lines 50-62, step 356, assigned to two routes with minimum capacity, using the route with the least capacity for restoration).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path

taught by Doshi ‘875 into the system of Qiao ‘582, since Doshi ‘875 recited the motivation in the col. 1, lines 23-25 which restoring communication in a network after a failure in link, span or node of the network, and more particular to restoration techniques in which restoration paths are pre computed at nodes distributed throughout the network.

Regarding to claim 23, Qiao ‘582 disclose the limitations of claim 20 above.

However, Qiao ‘582 are silent to disclosing the method is implemented for each of a set of candidate primary paths, wherein a path pair cost is generated for each candidate primary path as the sum of the path cost of the candidate primary path and the path cost of the corresponding minimum-cost restoration path; and the method further comprises selecting: i) candidate primary path from the set of candidate restoration paths and (ii) the corresponding minimum-cost restoration path that together have the lower path pair cost .

Doshi ‘875 discloses the method is implemented for each of a set of candidate primary paths, wherein a path pair cost is generated for each candidate primary path as the sum of the path cost of the candidate primary path and the path cost of the corresponding minimum-cost restoration path; and the method further comprises selecting: i) candidate primary path from the set of candidate restoration paths and (ii) the corresponding minimum-cost restoration path that together have the lower path pair cost (see col. 33, lines 14-20).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the method is implemented for each of a set of candidate primary paths, wherein a path pair cost is generated for each candidate primary path as the sum of the path cost of the candidate primary path and the path cost of the corresponding minimum-cost restoration path; and the method further comprises selecting: i) candidate primary path from the set of candidate restoration paths and (ii) the corresponding minimum-cost restoration path that together have the lower path pair cost taught by Doshi '875 into the system of Qiao '582, since Doshi '875 recited the motivation in the col. 1, lines 23-25 which restoring communication in a network after a failure in link, span or node of the network, and more particular to restoration techniques in which restoration paths are pre computed at nodes distributed throughout the network.

7. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Qiao '582 – Doshi '875) in view of Sinha (Patent No.: US 6,904,462 B1)

Regarding to claim 21, the combined system (Qiao '582 – Doshi '875) discloses the limitations of claim 20 above.

However, the combined system (Qiao '582 – Doshi '875) are silent to disclosing wherein the specified set of links excludes links in the network that are not SRLG-disjoint from the links of the new primary path, wherein: a shared risk group (SRLG) is a set of two or more links, for which a failure of any one link in the SRLG is associated

with a relatively high risk of failure of the other links in the SRLG; and two links are SRLG-disjoint when they are not members of any one SRLG.

Sinha '462 discloses wherein the specified set of links excludes links in the network that are not SRLG-disjoint from the links of the new primary path, wherein: a shared risk group (SRLG) is a set of two or more links (col. 3, lines 65-67) , for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG; and two links are SRLG-disjoint when they are not members of any one SRLG (col. 2, lines 50-55).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the specified set of links excludes links in the network that are not SRLG-disjoint from the links of the new primary path, wherein: a shared risk group (SRLG) is a set of two or more links, for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG; and two links are SRLG-disjoint when they are not members of any one SRLG taught by Sinha '462 into the combined system (Qiao '582 – Doshi '875). One would have motivated to do so to utilize minimum bandwidth usage is desirable to reduce cost of routing information at economy of scale (Sinha col. 1, line 35).

Regarding to claim 22, the combined system (Qiao '582 – Doshi '875) disclose the limitations of claim 20 above.

However, the combined system (Qiao '582 – Doshi '875) are silent to disclosing wherein the exclusion of links in the network that are not SRLG-disjoint from the links of the new primary path is accomplished by assigning an infinite initial cost to those links.

Sinha '462 discloses wherein the exclusion of links in the network that are not SRLG-disjoint from the links of the new primary path is accomplished by assigning an infinite initial cost to those links (col. 3, lines 63-64, col. 4, lines 12-15).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the exclusion of links in the network that are not SRLG-disjoint from the links of the new primary path is accomplished by assigning an infinite initial cost to those links taught by Sinha '462 into the combined system (Qiao '582– Doshi '875). One would have motivated to do so to utilize minimum bandwidth usage is desirable to reduce cost of routing information at economy of scale (Sinha '462 col. 1, line 35).

Allowable Subject Matter

8. Claims 1-4, 8-14, 18, 19 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: Claim 1 is allowed. Ishibashi et al. (2003/0147352) discloses a system for determining a restoration path corresponding to a primary path (301, 302) for a new service in a mesh network (page 1, [0004], multi-protocol label switching technology in a mesh network) having a plurality of nodes (figure 16, ABCDEF) interconnected by a plurality of links (figure 16, G1...G7), the system comprising:

For each link of a specified set of links in the network: (1) assigning an initial cost to the link (figure 16, page 11 [0148] the working path 302 has shared bandwidth of STS-3, the protection path 312 has shared bandwidth of STS-3); (2) determining whether the link's bandwidth can be shared with a new restoration path (shared bandwidth of protection path) for the new primary path ((shared bandwidth of working path).

Sinha (6904462) discloses calculating the minimum-cost restoration path for the new primary path using the specified set of links, wherein the cost of the minimum-cost restoration path is based on the sum of the cost of the links of the minimum-cost restoration path (see abstract, a path cost is determined for at least two protection paths based on a sum of link costs associated with a respective protection paths. One of the at least two protection paths having the minimum path cost is selected to provide protection for the working path).

Zang et al. (7,209,975) discloses reducing the link's cost when it is determined that the link's bandwidth can be shared with the new restoration path (col. 13, lines 30-32, the backup paths are rerouted to maximize backup resource sharing with respect to SRG constraints, and the working paths are rearranged to reduce the number of wavelengths-links that working path use).

The prior art however fails to disclose (iv) reducing the link cost by a factor R for each link of each candidate restoration path for which sharing is possible, wherein the factor R is a function of a sharing degree for each link; and

(v) when sharing is not possible, then:

(a) determining whether utilization of the link is greater than a specified threshold;

(b) when the link utilization is greater than the specified threshold, then assigning the link cost as a function of an administrative weight for the link and available capacity on the link; and

(c) when the link utilization is less than the specified threshold, then assigning the link cost as a function of the administrative weight for the link; and

(2) generating a path cost for the candidate restoration path based on a sum of the link costs for the links of that candidate restoration path; and

(B) selecting one of the candidate restoration paths for the primary path based on minimum path cost.

Claims 18 is allowed. The prior art failed to disclose (B) selecting the restoration path for the new service based on the path cost for each candidate restoration path, wherein the sharability of a link in a candidate restoration path is represented by a sharing degree for the link, wherein the sharing degree is a maximum number of additional unit-bandwidth primary services that can be added to the candidate primary path without increasing restoration bandwidth reserved on the link, wherein the sharing degree SD for a link is given by:

SD = the maximum value m for which max{ m'Vpnl -t- Vnla } = RB,

wherein:

Vp,,~ is a primary path node-link vector for the corresponding candidate primary path;

V~a is an aggregate node-link vector for the link; and

RB is current reservation bandwidth on the link.

Claim 19 is allowed. The prior art failed to disclose

(B) selecting the restoration path for the new service based on the path cost for each candidate restoration path, wherein the method is implemented for each of a plurality of candidate primary paths to generate a path pair cost associated with the candidate primary path and further comprising selecting one of the candidate primary paths for the new service based on minimum path pair cost, wherein the plurality of candidate primary paths comprises:

K minimum-cost paths for the new service where the path cost of each candidate primary path is calculated as a function of the link costs of the links of the candidate primary path, and the link costs are calculated by:

(i) determining whether utilization of the link is greater than a specified threshold;

(ii) when the link utilization is greater than the specified threshold, then generating the link cost as a function of an administrative weight for the link and available capacity on the link;

and

(iii) when the link utilization is less than the specified threshold, then generating the link cost as a function of the administrative weight for the link.

10. Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHUONG T. HO whose telephone number is (571)272-3133. The examiner can normally be reached on 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sheikh Ayaz can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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